

REMARKS

All claims have been amended to reflect the correct claim number and the correct dependencies. Claim 26 has been further amended to delete reference to the trademark to overcome the Section 112 rejection. Claims 9-26 remain in the application. Reexamination and reconsideration of the application, as amended, are requested.

The rejections under 35 USC 103(a) over Dohrer ('927) or Dohrer ('188) in view of JP970094439, are respectively traversed.

Dohrer ('927) discloses a multilayer film A/B/C wherein the two outside layers A and C may comprise LLDPE having a density 0.890-0.930 g/cm³ and 0.890-0.980 g/cm³, respectively (which is overlapping with the 0.919-0.930 g/cm³ recited in claim 1) and the middle layer B is a thermoplastic film which may comprise a polyolefin such as polyethylene or a copolymer of ethylene and/or polypropylene and a minor amount of a C4-C12 mono-olefinic monomer such as buten-1 and isobutylene.

Neither of those references discloses the features of the middle layer of the invention as defined in claim 9.

The ^{int use} object of the invention is to find a multilayer composite film of food grade quality that meets the requirements of presenting flexibility and elasticity properties such as to allow the passage that forms the valve to close in a sealed manner and keeping those properties at the temperature of the liquid to be packaged, which may be as high as 80 or 90°C (see from page 2, line 34 to page 3, line 5).

Starting from Dohrer ('927) or Dohrer ('188), there is no hint in the prior art, and in particular the references cited by the Examiner, as to the solution of the invention, namely

^{int use}

providing a middle layer as defined in claim 9, in particular comprising 50-70% of polypropylene having a density of polypropylene of 0.895-0.905 g/cm³ and a melt index of 0.75-0.85g/10 min. Those properties of polypropylene are very important to achieve the flexibility properties required (see in particular page 5, lines 29-34).

JP 970094439 (see the DERWENT Abstract, as well as the Abstract and the automatic translation thereof provided by the Japanese Patent Office, appended), teaches a middle layer ("core layer") which is a mixture of (C) a polypropylene resin of 5-50% atactic polypropylene and 50-95% isoatactic polypropylene, and (D) polybutene-1, wherein the weight ratio of (C) to (D) is 0.1-4.0 and the melt index of the polypropylene resin is 1-10 g/min (see page 4 [0017] lines 1-2 of the automatic translation). No data on polypropylene density are disclosed.

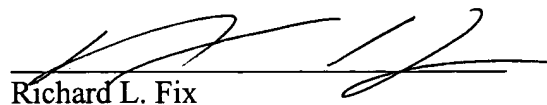
→ Disagreement

The invention of claim 9 is non obvious to the skilled person, and is believed to be patentable.

Likewise, dependent claims 10-26 are believed to be allowable and a notice to that effect is earnestly solicited.

Respectfully submitted,
Etienne SUSINI

By:


Richard L. Fix
Reg. No. 28,297

STURM & FIX LLP
206 Sixth Avenue, Suite 1213
Des Moines, Iowa 50309-4076
Telephone: (515) 288-9589
Telefax: (515) 288-5311

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-272747

(43)Date of publication of application : 13.10.1998

(51)Int.Cl. B32B 27/32
B32B 27/32
B29C 47/06
B29C 61/06
B32B 7/02
// C08L 23/04
C08L 23/08
C08L 23/10
C08L 23/20
B29K 23:00
B29K105:02
B29L 9:00

(21)Application number : 09-094439 (71)Applicant : KOHJIN CO LTD

(22)Date of filing : 31.03.1997 (72)Inventor : SAEKI OSAMU
KIYAMA NARIMITSU
HAMADA KAZUHIRO
MATSUMOTO TORU

(54) LAMINATED STRETCH SHRINK FILM

(57)Abstract:

PROBLEM TO BE SOLVED: To sufficiently heat seal a various tray shapes by mixing specific wt.% of nonionic surfactant composition in one or more layers, and orienting it.

SOLUTION: A laminated film having a surface layer of a mixture obtained by mixing polyethylene resin (A) such as low-density polyethylene and low crystalline ethylene- α -olefin copolymer (B) having a density of 0.860 to 0.900 g/cm³ and a melt index of 0.1 to 20 g/10 min at a melt peak temperature of 50 to 100°C by amorphous or differential scanning calorimeter by weight indicated by a formula of $0 \leq (B)/(A+B) \leq 0.7$ and a core layer containing as a main component a mixture obtained by mixing polypropylene flexible resin (C) of a mixture of 5 to 50 wt.% of atactic polypropylene and 50 to 95 wt.% of crystalline isoatactic polypropylene and polybutene-1 (D) by weight indicated by a formula of $0.10 \leq (C)/(D) \leq 9.0$ is obtained. This one or more layers is mixed with 0.1 to 4.0 wt.% of nonionic surfactant composition, and laterally and longitudinally oriented by twice or more.

LEGAL STATUS

[Date of request for examination] 26.03.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] About a laminating stretch shrink film, as the stretch packaging used for the pre package of the retail trade article which makes food a subject especially in more detail, or a film for shrink packing, this invention is excellent in automatic packer fitness, such as heat-sealing nature and stretchable, and even if it recycles the trim of a film etc. (it is hereafter described as a recovery article), it relates to the laminating stretch shrink film which transparency and gloss become from at least three or more good layers.

[0002]

[Description of the Prior Art] In recent years, the need of stretch films for food packing, such as meat, fish and shellfishes, vegetables, fruit, and a daily dish, is increasing further with expansion of a supermarket and a convenience store. Since the above-mentioned stretch film has the performance in which the film made from the plasticized polyvinyl chloride was excellent in transparency, self-adhesiveness, etc., although it is conventionally used abundantly most In since a lot of plasticizers are used, if the amount of transparency of a steam increases and loss of weight and transformation of packaging goods-ed tend to take place It has if a plasticizer shifts to packaging goods-ed and it is easy to pollute it, and the problem of the safe sanitation of the still more detrimental hydrogen chloride gas at the time of abandonment incineration occurring at the time of film molding or film fusing under packing work, and pollution. For this reason, development of the film which replaces a plasticized polyvinyl chloride is actively performed using ethylene system resins, such as polyethylene and an ethylene vinylacetate copolymer, a polybutadiene resin, polypropylene resin, etc. However, although the problem of safe sanitation and pollution does not have the film obtained by the aforementioned ethylene system resin or polypropylene resin, you should not satisfy it yet as a stretch film.

[0003] On the other hand, with diversification of packaging goods-ed, with the seal according [what has many moisture of pickles, food boiled down in soy etc.] only to self-adhesiveness, the seal section exfoliates by adhesion of moisture, loss of weight of packaging goods-ed takes place, there is a problem that goods value will fall further, and what can fully be heat sealed is desired. Moreover, depending on packaging goods-ed, what Siwa and sagging may remain, may say that a packing result tight enough is not obtained, and has thermal-contraction nature is desired only with stretchable. Moreover, a hand lap packer is replaced from a viewpoint of a productivity rise and packing speedup, and the request of expansion of a convenience store and a supermarket and the improvement in automatic packer aptitude of as opposed to [it is remarkable conjointly and] a packing film also has the strong spread of a stretch automatic packer, stretch shrink automatic packers, etc. That this invention persons should already solve the fault which the aforementioned stretch film has Excel in transparency and gloss, and have moderate gas permeability, and steam permeability does not have loss of weight of packaging goods-ed low. Using a polyethylene system resin without the chlorine gas at the time of shift of a plasticizer or combustion, have thermal-contraction nature and stretchable, and heat sealing is fully possible with a hot platen, and it aims at a shrink-package result offering a good film. a specific line -- the multilayer polyethylene system stretch shrink film which makes a low density polyethylene a principal component was proposed (JP,3-215034,A, JP,8-90737,A)

[0004]

[Problem(s) to be Solved by the Invention] However, also in the above-mentioned multilayer polyethylene system stretch shrink film, about the heat-sealing nature (it heats on a hot platen and carry out heat welding of the films) in an automatic packer, when not necessarily enough, it was. For example, even if the temperature nonuniformity of the heat-sealing section tended to become large, tended to carry out sufficient heat sealing and raised hot-platen temperature compared with a flat tray, before the thing of an anomaly [configuration / of a bottom] obtained sufficient heat sealing, it exceeded and fused the heat-resistant temperature of a film, and a hole opened it, and it had had the meaning of heat sealing like the raised bottom tray which heightened the display effect, or the tray which prepared a rib in a bottom for the purpose of an on-the-strength rise. That is, since it can respond to the tray of various configurations, a large thing of a heat-sealing temperature requirement is desired with thermal resistance, stretchable (flexibility), and transparency.

[0005] As a stretch shrink film using the polypropylene resin and the polyethylene system resin For example, although indicated by JP,63-173641,A, JP,8-80565,A, JP,6-115027,A, JP,5-318682,A, JP,7-314623,A, etc. Are what attains the balance of a property by the multilayer of four or more layers, or [that stretchable / lateral / is inadequate as for these] And heat-sealing nature is not enough or [being inferior to thermal resistance or transparency] It has one or more faults of being as an acetic-acid smell occurring after passing a contraction tunnel, if a recovery article is recycled **** [and], and was hard to say that it has property sufficient as a stretch shrink film. [that transparency falls]

[0006]

[Means for Solving the Problem] The result wholeheartedly examined in order that this invention person etc. might conquer the fault of the aforementioned stretch shrink film, By using the surface which consists of a core layer which makes a principal component a specific polypropylene system elasticity resin and mixture of a polybutene -1, and a polyethylene system resin, with the composition of three layers Corresponding to the tray of various configurations, heat sealing is fully possible, and it has stretchable [lateral]. There was not an acetic-acid smell, but even if it recycles a recovery article, it finds out that the stretch shrink film in which transparency and gloss possessed the good outstanding automatic packer aptitude is obtained, and it came to complete this invention. namely, this invention -- the following -- the polyethylene system resin of (A), and the following -- with the surface which consists of mixture blended by the weight ratio the ethylene-alpha olefin copolymer of (B) is indicated to be by several 4 The polybutene -1 of (D) is the laminated film of three or more layers which has the core layer which makes a principal component mixture blended by the polymerization ratio shown by several 5. the following -- the polypropylene system elasticity resin of (C), and the following -- a non-ion system surfactant constituent is blended with at least one or more layers 0.1 to 4.0% of the weight, and in every direction -- the laminating stretch shrink film which gave extension processing more than double precision, respectively is offered

(A) a low density polyethylene and a line -- it is chosen a low density polyethylene and from super-low density polyethylenes -- at least -- the polyethylene system resin more than a kind

(B) The ethylene-alpha olefin copolymer of low crystallinity whose dissolution peak temperature according [0.860 - 0.900 g/cm³ and a melt index] in density to the amorphia for 0.1-20g / 10 minutes or a differential scanning calorimeter is 50-100 degrees C.

(C) The polypropylene system elasticity resin which consists of mixture of 5 - 50 % of the weight of atactic polypropylene, and 50 - 95 % of the weight of crystalline isotactic polypropylene.

(D) Polybutene -1 [0007]

[Equation 4] $0 \leq (B)/(A+B) \leq 0.7$ [0008]

[Equation 5] $0.10 \leq (C)/(D) \leq 9.0$ [0009] Hereafter, this invention is explained in detail. The polyethylene system resin (A) of the surface of this invention is mainly making the operation which gives the heat-sealing nature in the hot platen in an automatic packer. the line whose carbon number is a copolymer with one sort or two sorts or more of 4-8 alpha olefins preferably 3-20 carbon numbers which contain the low density polyethylene which has long-chain branching,

ethylene, a propylene, butene-1, a pentene -1, a hexene -1, 4-methyl pentene -1, an octene -1, and decene -1 as a polyethylene system resin used -- it is chosen out of a low density polyethylene and a super-low density polyethylene -- more than a kind is mentioned at least from the point which is easy to give the heat-sealing nature in low temperature among these -- comparatively -- the low of density -- a line -- the line with comparatively narrow molecular weight distribution manufactured using the so-called metallocene catalyst (single site catalyst) from the point which a low density polyethylene and a low density polyethylene are used suitably, and suppresses too much blocking, and is easy to give low-temperature heat-sealing nature -- a low density polyethylene etc. is used [0010] The density of a polyethylene system resin (A) is 0.890 - 0.940 g/cm³. The thing of the range is desirable and it is 0.890 g/cm³. Blocking excessive in the following occurs and it is 0.940 g/cm³ preferably. If it exceeds, low-temperature heat-sealing nature falls and is not desirable. Moreover, in 0.1g / less than 10 minutes, a melt index (it is hereafter described as MI) is the thing of the range for 0.1-10g / 10 minutes, processability falls, and preferably, if 10g / 10 minutes are exceeded, too much blocking will generate it.

[0011] In this invention, according to packing conditions etc., when low-temperature heat-sealing nature is still more nearly required, it can mix with the above-mentioned polyethylene system resin on a surface, and an ethylene-alpha olefin copolymer (B) can be used for it. It is the ethylene of low crystallinity and the copolymer of an alpha olefin whose dissolution peak temperature measured with amorphia or a differential scanning calorimeter (it is hereafter described as DSC) is 50-100 degrees C as an ethylene-alpha olefin copolymer used, for example, a copolymer with ethylene, a propylene, butene-1, a pentene -1, a hexene -1, 4-methyl pentene -1, an octene -1, decene -1, or such mixture is mentioned, and a copolymer with butene-1 is used preferably. Moreover, although the rate of the ethylene-alpha olefin copolymer (B) which mixes with a polyethylene system resin (A) and is used is the range of a weight ratio shown by several 4, and the effect of low-temperature heat-sealing nature will become large if this is exceeded, generating of blocking is not awfully desirable even when a surfactant is added.

[0012]

[Equation 4] $0 \leq (B)/(A+B) \leq 0.7$ [0013] The density of an ethylene-alpha olefin copolymer (B) is 0.860 - 0.900 g/cm³. The thing of the range is used and it is 0.860 g/cm³. At the following, although it becomes large, blocking occurs, and the effect of low-temperature heat-sealing nature is 0.900 g/cm³ preferably. If it exceeds, the effect of low-temperature heat-sealing nature is not small desirable. Moreover, if the thing of the range for 0.1-20g / 10 minutes is used, processability falls in 0.1g / less than 10 minutes and 20g / 10 minutes are exceeded preferably, too much blocking becomes easy to generate and is not desirable [MI of the ethylene-alpha olefin copolymer to be used].

[0014] the point of attaining the balance of good low-temperature seal nature and good adhesiveness, and a blocking resistance in the combination of a surface raw material -- it is -- a low density polyethylene and a line -- the combination of the ethylene-alpha olefin copolymer (B) which is the polyethylene system resin (A), the ethylene, and the copolymer of butene-1 which consist of a low density polyethylene is used suitably

[0015] the polypropylene system elasticity resin (C) used for a core layer in this invention -- the amount of macromolecules -- a boil heptane -- 5 - 50 % of the weight of meltable atactic polypropylene, and a boil heptane -- it consists of mixture generated in the polymerization stage of 50 - 95 % of the weight of insoluble crystalline isotactic polypropylene, and the mechanical property of isotactic polypropylene is improved the thermal resistance near general crystalline polypropylene by that cause -- having -- in addition -- and the temperature requirement whose heat sealing is possible by having thermal resistance since the flexibility near polyethylene is shown is extended to an elevated-temperature side, and when the further below-mentioned polybutene -1, conjointly still better stretchable grant, prevention of the transparency fall considered to be based on distortion between layers, and a recovery article are recycled as a raw material of this film, the operation which maintains good transparency is made

[0016] You may be a copolymer with the alpha olefin of others [isotactic polypropylene], such as a homopolymer or ethylene, and butene-1, or a ternary polymerization object atactic [in a

polypropylene system elasticity resin (C)]. Since isotactic polypropylene will decrease if 50 % of the weight is exceeded preferably, crystallinity becomes [stretchable and transparency, and gloss are preferably inferior five to 55% of the weight in it being 5 - 25 % of the weight, and being less than 5 % of the weight,] low and thermal resistance falls, the content of the atactic polypropylene in a polypropylene system elasticity resin is not desirable. Moreover, the atactic polypropylene contained in a polypropylene system elasticity resin (C) is fusibility at a boil heptane, and about 50,000 to 100,000 thing of number average molecular weight is desirable. Usually, it is about 10,000 or less number average molecular weight of the atactic polypropylene which carries out a byproduction at the time of crystalline polypropylene manufacture, and is the thing of the amount of macromolecules as compared with this.

[0017] The 230-degree C melt flow rates (it omits Following MFR) of a polypropylene system elasticity resin (C) are 1 - 10g / 10 minutes, and 150 degrees C or more and the heat of fusion have [the dissolution peak temperature of the polypropylene system elasticity resin further measured in DSC] 20 to 80 kJ/desirable kg. Stretchable falls and is not desirable, if thermal resistance falls that dissolution peak temperature is [less than 150 degrees C or the heat of fusion] 20 kJ(s)/less than kg and the heat of fusion exceeds 80 kJ(s)/kg. Moreover, although the propylene homopolymer and propylene system copolymer which are general crystalline polypropylene as some polypropylene system elasticity resins (C) can also be mixed and used, it is required to include the atactic polypropylene in a polypropylene resin 5% of the weight or more. In addition, in this invention, measurement of the dissolution peak temperature by DSC and the heat of fusion was performed according to the method of JIS K7121 and JIS K7122 publication.

[0018] The polybutene -1 (D) used for a core layer is making the aforementioned polypropylene system elasticity resin (C) and the operation which gives stretchable [in transparency, gloss, and automatic packer fitness] conjointly. Unlike the polybutene of the shape of the shape of liquid, or a wax, the polybutene -1 (D) used is crystallinity or low crystallinity, and is a copolymer with a butene-1 homopolymer, ethylene, or a propylene, and the thing for 0.1 - 30g / 10 minutes is used for MFR [in / 0.885 - 0.920 g/cm³ and 190 degrees C / in density]. From the stretchable point in transparency, gloss, and automatic packer fitness, % of a 15-40-mol butene-1 propylene copolymer is suitably used for a propylene content.

[0019] this invention can mix and attain a polypropylene system elasticity resin (C) and a polybutene -1 (D), and although the weight ratio shown by several 5 is used from the point that the weight ratio of (C)/(D) in a core layer tends to be compatible in thermal resistance, a stretch, and transparency, the range of 0.6-4.0 is preferably used for a weight ratio. (C) Thermal resistance falls that / (D) is less than 0.1, and a heat-sealing temperature requirement becomes narrow and is not desirable. On the other hand, if (C)/(D) exceeds 9.0, stretchable and transparency will become inadequate.

[0020]

[Equation 5] $0.10 \leq (C)/(D) \leq 9.0$ [0021] In this invention, the above-mentioned polyethylene system resin (A) and an ethylene- α olefin copolymer (B) can be mixed to a core layer in addition to a polypropylene system elasticity resin (C) and a polybutene -1 (D), and it can use for it. The case where the film intensity (tear intensity, impact strength) according to uses, such as the difficulty of being torn demanded in case the contents which have projections, such as a shrimp and a crab, are packed when a recovery article is recycled and a surface composition resin mixes to a core layer as an example to be used and, or opening nature, is adjusted is raised. Although there will be especially no limit if the addition of these resins in a core layer is within the limits which does not have trouble in the purpose of this invention, the weight ratio shown by several 6 is desirable.

[0022]

[Equation 6] $(A+B)/(A+B+C+D) \leq 0.7$ [0023] In this invention, the non-ion system surfactant added to at least one or more layers Although it will not limit especially if generally marketed, for example A glycerine fatty acid ester, Polyglyceryl fatty acid ester, a sorbitan fatty acid ester, polyethylene glycol fatty acid ester, Polyoxyethylene sorbitan fatty acid ester, propylene glycol fatty acid ester, Sucrose fatty acid ester, citric-acid monochrome (JI or TORI) stearyl ester,

Pentaerythritol fatty acid ester, trimethylol-propane fatty acid ester, Polyoxyethylene glycerine fatty acid ester, polypropylene-glycol fatty acid ester, Polyoxyethylene alkyl phenyl ether, polyoxyethylene alkyl ether, Polyoxypropylene polyoxyethylene BURROKU polymer, a polyethylene glycol, One sort of non-ion system surfactants, such as a polypropylene glycol, a polyethylene oxide, alkyl diethanolamide, polyoxyethylene alkylamine, an ethyleneoxide addition product of castor oil, and isopropyl alcohol, or two sorts or more are mixed, and are used. It is desirable that polyoxyethylene sorbitan fatty acid ester is included especially from the point of suppressing the transparency fall after contraction by the superfluous bleeding of a surfactant. It is 0.1 - 4.0 % of the weight, and at less than 0.1 % of the weight, even if fog resistance is not obtained but the addition of this non-ion system surfactant exceeds 4.0 % of the weight, fog resistance improvement is not found and it is not desirable.

[0024] Although especially a limit does not have the thickness of the film of this invention, according to the film intensity and gas barrier nature which are demanded, the range of 5-20micro is preferably desirable 5-30micro. Moreover, 1.6% or less of thing of Hayes is desirable at the point of discriminating packaging goods-ed easily and not reducing goods value.

[0025] Although the purpose of this invention is attained by three layers of the surface which consists of a core layer and an above-mentioned inner layer, and an above-mentioned outer layer, naturally it is also possible to prepare the interlayer who is chosen from the above-mentioned (A), (B), (C), and (D) between a core layer and a surface and who consists of a resin more than a kind at least, and to balance various properties. Moreover, if it is the range which does not cause trouble to the purpose of this invention, naturally additives, such as lubricant, an anti blocking agent, and an antistatic agent, are used suitably the making a respectively effective operation provide purpose.

[0026] The laminating stretch shrink film of this invention is manufactured by the well-known extension method. Although weak thermal-contraction nature can be given also by the so-called tubular film process which extends a film, without extruding a melting resin from an annular dice and once carrying out quenching solidification, in order to discover sufficient low-temperature thermal-contraction nature, the method of reheating the non-extended original fabric which once carried out quenching solidification, and extending at the temperature below the melting point of the polypropylene system elasticity resin of a core layer is good. draw magnification -- length and each width -- extension orientation is carried out 3 or more times still more preferably 2.5 or more times preferably more than double precision Moreover, it is better to make lengthwise draw magnification into height a little, in order to make stretchable [of the longitudinal direction of the oriented film obtained] discover more effectively. It is the above, and is made and extended and the film picked out from extension equipment can heat-treat heat setting, aging, etc. if needed. Moreover, corona discharge etc. can also be processed in order to carry out bleeding of the antifogger still more quickly.

[0027]

[Example] Although an example explains this invention still more concretely below, this invention is not limited to these examples, unless the summary is exceeded. The raw material resin used in the example and the example of comparison is shown below.

A1: Low density polyethylene (high-pressure-process and density =0.922 g/cm³, 10 MI=2.0g /, minutes)

A2: -- a line -- a low density polyethylene (a multi-site catalyst, density =0.918 g/cm³, 10 MI=1.0g /, minutes)

A3: -- a line -- a low density polyethylene (multi-site catalyst and density =0.910 g/cm³, 10 MI=3.0g /, minutes)

A4: -- a line -- a low density polyethylene (multi-site catalyst and density =0.916 g/cm³, 10 MI=1.2g /, minutes)

A5: -- a line -- a low density polyethylene (single site catalyst and density =0.916 g/cm³, 10 MI=1.5g /, minutes)

A6: -- a line -- a low density polyethylene (multi-site catalyst and density =0.920 g/cm³, 10 MI=0.5g /, minutes)

B1: Ethylene-butene-1 copolymer (density =0.88 g/cm³, 10 MI=3.6g /, minutes)

C1: Polypropylene system elasticity resin (atactic polypropylene content 10 % of the weight and MFR(230 degrees C) =2.5g /, 10 minutes, dissolution peak temperature =162 degree C, heat-of-fusion =62kJ/kg)

C2: Polypropylene system elasticity resin (atactic polypropylene content 30 % of the weight and MFR(230 degrees C) =2.5g /, 10 minutes, dissolution peak temperature =161 degree C, heat-of-fusion =50kJ/kg)

D1: Polybutene -1 homopolymer (density =0.915 g/cm³, 10 MFR(190 degrees C) =1.8g /, and minutes, dissolution peak temperature =115 degree C)

D2: Butene-1 propylene copolymer (density =0.900 g/cm³, 10 MFR(190 degrees C) =1.0g /, and minutes, dissolution peak temperature =70 degree C)

D3: Butene-1 ethylene copolymer (density =0.890 g/cm³, 10 MFR(190 degrees C) =0.2g /, and minutes, dissolution peak temperature =86 degree C)

E1: Propylene homopolymer (MFR(230 degrees C) =2.4g /, 10 minutes, dissolution peak temperature =162 degree C, heat-of-fusion =96kJ/kg)

E2: Propylene ethylene random copolymer (MFR(230 degrees C) =2.4g /, 10 minutes, dissolution peak temperature =144 degree C, heat-of-fusion =70kJ/kg)

[0028] Moreover, it asked for each physical-properties measurement shown in this example by the following methods.

(1) It measured according to Hayes JIS-K7105.

(2) It measured according to gross JIS-K7105.

(3) Two croquettes with a height of 25mm were carried on the raised bottom tray made from polystyrene with stretch method automatic packer fitness width of face of 123mm, a length [of 150mm], and a depth of 18mm, the stretch automatic packer of the hot platen for heat sealing and the pyro method of marketing equipped with the contraction tunnel performed the packing test by 30 pieces at a part for 30 packing speed/, and bag manufacture fitness and the heat-sealing temperature requirement were investigated. Evaluation of bag manufacture fitness was based on the following criteria about the tray deformation in the bag manufacture section, and the existence of breakage.

O ... There is also no trouble of a tray breaking or deforming at the time of bag manufacture (while packaging goods-ed extending a film, when a lap being carried out), and a beautiful result is obtained.

x ... A tray is deformed or damaged at the time of bag manufacture. Moreover, the heat-sealing temperature requirement investigated the hot-platen seal setting temperature (heat-resistant temperature) before a hole opens at the film at the hot-platen seal setting temperature (heat-sealing start temperature) in which the whole heat-sealing section surface fully begins to carry out heat welding, and the base of a tray to the grade which will be torn if the insertion portion of a film is heat sealed and it exfoliates by force on a tray base, and asked for it from the difference of heat-resistant temperature and heat-sealing start temperature. Moreover, hot-platen seal setting temperature was raised in 5-degree-C pitch.

(4) With a film, cover and after putting 30ml of 18-degree C water into the fog resistance beaker of 100ml, fix the beaker upper surface so that there may be no wrinkle. Next, this beaker is put in for 5 seconds into the hot blast adjusted to 110 degrees C, and carries out a thermal contraction. Then, it was left in the 5-degree C open showcase for 1 hour, a cloudy condition of a film was observed, and it was based on the following criteria.

O ... It is completely cloudiness-less delta... Although waterdrop is attached to the part, the interior of a beaker is visible.

x ... The whole surface has bloomed cloudy and the interior of a beaker cannot be seen.

[0029] To the raw material resin of the compounding ratio shown in example 1 table 1, 0.2 % of the weight of non-ion system surfactant polyoxyethylene (n= 20) sorbitan monopalmitate, The constituent for surfaces and the constituent for core layers which added 1.8 % of the weight of diglycerol fatty acid ester by three sets of extruders Melting kneading of each was carried out at 170 degrees C - 240 degrees C, the extrusion outlet of each extruder was adjusted so that the

thickness after extension might be set to surface (inner layer):core layer:surface (outer layer) =1:5:1 in 13 micrometers and the thickness ratio of each class, and it extruded downward from the slit of the three-layer annular dice kept at 240 degrees C. The gap of a slit of the diameter of the slit of an annular dice was 0.8mm in 75mm. Sliding the outside surface of the cylindrical shape mandrel which circulates through the extruded 3 lamination melting tube-like film directly under a dice, and circulates through 20-degree C cooling water inside by 76mm of attachment *****, by letting a tank pass, water cooling of the outside was carried out, it was cooled and taken over to the room temperature, and obtained the tube-like unstretched film with a diameter [of about 75mm], and a thickness of 245 micrometers. It led to the tubular biaxial-stretching equipment which showed this tube-like unstretched film in the view 1, and expansion extension was performed. At this time, the voltage of the annular infrared heater of a preheater 4 and current were adjusted, and the film temperature of a preheater outlet was adjusted. Classify eight annular infrared heaters of main **** 5 four times, adjust each voltage and current, and a film is heated. Pressurization air is sent into the tubular film between the low-speed nip roll 2 and the high-speed nip roll 3 while supplying the air which flows along with a bubble from the main **** lower part. This air and a low speed, By the peripheral-speed ratio of a high-speed nip roll, bubble extension was turned 5.0 times as many length as this and sideways [4.0 times (20 times as many area draw magnification as this) as many as this], and about 13-micrometer oriented film was obtained. Ductility is good, and there is also neither vertical movement of an extending point nor rocking of an extension bubble, and uneven extension states, such as necking, were not observed, either. The obtained film had fog resistance, transparency, and good gloss, as shown in Table 3. When the stretch automatic packer of a pyro method performed the packing test using the raised bottom tray, it has stretchable, there are also no deformation and breakage of a tray in the bag manufacture section, and good bag manufacture fitness was acquired. Moreover, the heat-sealing temperature requirement was also wide and it was that practical.

[0030] The laminating stretch shrink film was manufactured like the example 1 except having changed raw material resin composition, as shown in two to example 7 table 1. Each ductility is good, and there is also neither vertical movement of an extending point nor rocking of an extension bubble, and uneven extension states, such as necking, were not observed, either. The obtained film had fog resistance, transparency, and good gloss, as shown in Table 3. When the stretch automatic packer of a pyro method performed the packing test using the raised bottom tray, it has stretchable, there are also no deformation and breakage of a tray in the bag manufacture section, and good bag manufacture aptitude was acquired. Moreover, the heat-sealing temperature requirement was also wide and it was that practical.

[0031] The film manufactured in the example 8 example 1 was ground, and the laminating stretch shrink film was manufactured like the example 1 by using as a recovery article the coarse thing made granular except having changed raw material resin composition, as shown in Table 1. Each ductility is good, and there is also neither vertical movement of an extending point nor rocking of an extension bubble, and uneven extension states, such as necking, were not observed, either. The obtained film had fog resistance, transparency, and good gloss, as shown in Table 3. When the stretch automatic packer of a pyro method performed the packing test using the raised bottom tray, it has stretchable, there are also no deformation and breakage of a tray in the bag manufacture section, and good bag manufacture aptitude was acquired. Moreover, the heat-sealing temperature requirement was also wide and it was that practical.

[0032] The laminating stretch shrink film was manufactured like the example 1 except having changed raw material resin composition, as shown in example of comparison 1 table 2. Each ductility is good, and there is also neither vertical movement of an extending point nor rocking of an extension bubble, and uneven extension states, such as necking, were not observed, either. The obtained film had fog resistance, transparency, and good gloss, as shown in Table 3. When the stretch automatic packer of a pyro method performed the packing test using the raised bottom tray, it has stretchable, there are also no deformation and breakage of a tray in the bag manufacture section, and good bag manufacture aptitude was acquired. However, the heat-sealing temperature requirement was narrow and practicality was insufficient for it.

[0033] The laminating stretch shrink film was manufactured like the example 1 except having changed raw material resin composition, as shown in example of comparison 2 table 2. Each ductility is good, and there is also neither vertical movement of an extending point nor rocking of an extension bubble, and uneven extension states, such as necking, were not observed, either. Fog resistance was good as the obtained film was shown in Table 3. Transparency and gloss were a little inferior as compared with the film obtained in the example. When the stretch automatic packer of a pyro method performed the packing test using the raised bottom tray, stretchable is inadequate, deformation and breakage of a tray were seen in the bag manufacture section, and good bag manufacture aptitude was not acquired. The heat-sealing temperature requirement was wide.

[0034] The film manufactured in the example 2 of example of comparison 3 comparison was ground, and the laminating stretch shrink film was manufactured like the example 1 by using as a recovery article the coarse thing made granular except having changed raw material resin composition, as shown in Table 2. Each ductility is good, and there is also neither vertical movement of an extending point nor rocking of an extension bubble, and uneven extension states, such as necking, were not observed, either. Although fog resistance was good as the obtained film was shown in Table 3, transparency and gloss were falling by recycling a recovery article. When the stretch automatic packer of a pyro method performed the packing test using the raised bottom tray, stretchable is inadequate, deformation and breakage of a tray were seen in the bag manufacture section, and good bag manufacture aptitude was not acquired. The heat-sealing temperature requirement was wide.

[0035] The laminating stretch shrink film was manufactured like the example 1 except having changed raw material resin composition, as shown in example of comparison 4 table 2. Each ductility is good, and there is also neither vertical movement of an extending point nor rocking of an extension bubble, and uneven extension states, such as necking, were not observed, either. Fog resistance was good as the obtained film was shown in Table 3. Transparency and gloss were a little inferior as compared with the film obtained in the example. When the stretch automatic packer of a pyro method performed the packing test using the raised bottom tray, stretchable is inadequate, deformation and breakage of a tray were seen in the bag manufacture section, and good bag manufacture fitness was not acquired. The heat-sealing temperature requirement was a latus thing.

[0036] The film manufactured in the example 4 of example of comparison 5 comparison was ground, and the laminating stretch shrink film was manufactured like the example 1 by using as a recovery article the coarse thing made granular except having changed raw material resin composition, as shown in Table 2. Each ductility is good, and there is also neither vertical movement of an extending point nor rocking of an extension bubble, and uneven extension states, such as necking, were not observed, either. Although fog resistance was good as the obtained film was shown in Table 3, transparency and gloss were falling by recycling a recovery article. When the stretch automatic packer of a pyro method performed the packing test using the raised bottom tray, stretchable is inadequate, deformation of a tray was seen in the bag manufacture section, and good bag manufacture fitness was not acquired. The heat-sealing temperature requirement was a latus thing.

[0037]

[Table 1]

		実 施 例							
		1	2	3	4	5	6	7	8
表層の原料 配合比 (重量%)	A1	35	35	35	35	-	-	-	35
	A2	35	35	35	35	-	35	35	35
	A3	-	-	-	-	100	-	-	-
	A5	-	-	-	-	-	35	35	-

	B1	30	30	30	30	-	30	30	30
芯層の原料 配合比 (重量%)	A1	-	30	-	30	-	30	30	-
	A4	-	-	-	-	30	-	-	-
	B1	-	-	15	-	-	-	-	-
	C1	-	-	-	42	-	21	-	-
	C2	60	42	68	-	42	-	7	30
	D1	-	-	-	28	-	-	-	-
	D2	40	28	17	-	-	49	49	20
	D3	-	-	-	-	28	-	-	-
	E1	-	-	-	-	-	-	14	-
	回収品	-	-	-	-	-	-	-	50

[0038]

[Table 2]

		比 較 例				
		1	2	3	4	5
表層の原料 配合比 (重量%)	A1	35	35	35	35	35
	A2	35	35	35	35	35
	B1	30	30	30	30	30
芯層の原料 配合比 (重量%)	A6	100	-	-	-	-
	E1	-	100	50	-	-
	E2	-	-	-	100	50
	回収品	-	-	50	-	50

[0039]

[Table 3]

	ヘ イ ズ %	グ ロ ス %	ストレッチ方式 自動包装機適性				防 曇 性
			製 袋 適 性	シ 開 始 ル 温 度 ℃	耐 熱 温 度 ℃	シ 温 度 ル 範 囲 ℃	
実施例 1	1.1	140	○	140	175	35	○
実施例 2	0.8	145	○	140	175	35	○
実施例 3	0.9	142	○	140	175	35	○
実施例 4	0.8	145	○	140	175	35	○
実施例 5	1.1	140	○	140	180	40	○
実施例 6	0.9	141	○	140	175	35	○
実施例 7	1.0	140	○	140	175	35	○

実施例 5	0.8	145	○	140	175	35	○
比較例 1	1.3	140	○	140	150	10	○
比較例 2	1.6	134	×	140	190	50	○
比較例 3	2.2	128	×	140	190	50	○
比較例 4	1.6	135	×	140	165	25	○
比較例 5	2.1	128	×	140	165	25	○

[0040]

[Drawing 1]

[0041]

[Effect of the Invention] By using the surface which consists of a core layer which makes a principal component a specific polypropylene system elasticity resin and mixture of a polybutene - 1, and an ethylene system resin, it is the composition of at least three or more layers, and even if heat sealing is fully possible corresponding to the tray of various configurations, it has stretchable [lateral] and it recycles a recovery article, transparency and gloss are the stretch shrink films possessing the good outstanding automatic packer fitness.

Drawing selection drawing 1 

